NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

APEM

Environmental Imaging Solutions

Year 2 Digital Aerial Wildlife Survey of BOEM Lease Area OCS-A 520

Monthly Report (Year 2): August II 2021

Equinor Wind US

APEM Ref: P00005432

Issued December 2021

Matthew Arundale, Simon Warford, Julia Robinson-Willmott, and Derek Fair

Client:	**Scott Lundin**
Address:	**Equinor Wind US** **1 Lincoln Street** **Boston** **Massachusetts** **02111**
Project reference:	**P00005432**
Date of issue:	**December 2021**

Project Director:	**Gillian Sutherland**
Project Manager:	**Derek Fair**
Key Contributors:	**Matthew Arundale, Simon Warford, Julia Robinson-Willmott (Normandeau Associates)**

APEM, Inc.
2603 NW 13th Street
#402
Gainesville
Florida
FL 32609

Tel: (352) 559-9155

Document number of the corporation: P15000019267

Normandeau-APEM (2021). Digital Aerial Wildlife Surveys of BOEM Lease Area OCS-A 520: August II 2021. Scientific Monthly Report P00005432-09. Equinor Wind US, 15/12/2021, v1.0 Draft, 9 pp.

Revision and Amendment Register

Version Number	Date	Section(s)	Page(s)	Summary of Changes	Approved by
1.0	15/12/2021	All	All	Creation	MA
1.1	16/12/2021	All	All	Internal Review	DF

Contents

1. Executive Summary 1

2. Introduction 2

3. Summary of Survey 2

4. Abundance and Distribution 4

4.1 Species Abundance 4

4.2 Spatial Distribution 5

5. Shipping Observations 7

Appendix I Species List 8

Appendix II Example 'Snags' from the Survey 9

List of Figures

Figure 1 Survey design of Lease Area OCS-A 0520 plus 2 km / 4 km buffer 3

Figure 2 Distribution of all records from the second August 2021 survey of Lease Area OCS-A 0520 plus 2 km / 4 km irregular buffer 6

List of Tables

Table 1 Total number of individuals of birds recorded during the second August 2021 survey of the Lease Area OCS-A 0520 WEA plus 2 km / 4 km irregular buffer 4

Table 2 Total number of individuals of marine megafauna recorded during the second August 2021 survey of the Lease Area OCS-A 0520 WEA plus 2 km / 4 km irregular buffer 4

1. Executive Summary

- A digital aerial wildlife survey of the Bureau of Ocean Energy Management (BOEM) Lease Area Outer Continental Shelf – Atlantic (OCS-A) 0520, off the Massachusetts coast was conducted on August 17th, 2021 using APEM Inc.'s high-resolution camera system to capture digital still imagery.

- Images collected have been analyzed by APEM Inc. (hereafter referred to as APEM) and quality assured by Normandeau Associates (hereafter referred to as Normandeau). Raw counts of all species and incidental observations recorded during the second August 2021 survey are presented here.

- A total of 229 birds were recorded in the second August 2021 Survey Area. The most abundant group recorded was storm petrels (n=93), followed by shearwaters (n=80), shorebirds (n=40), gulls (n=12), terns (n=3), and unclassified gulls (n=1).

- A total of 129 birds (56%) were recorded in flight during the survey. These consisted of storm petrel species (n=93), great shearwater (n=19), Cory's shearwater (n=7), herring gull (n=5), 'commic' / Forster's tern (n=3), laughing gull (n=1), and lesser black-backed gull (n=1). There were 100 birds (44%) recorded as sitting.

- Six marine mammals were recorded during the survey, consisting of bottlenose dolphin (n=3), common dolphin (n=2), and seal species (n=1).

- One turtle was recorded during the survey, consisting of leatherback turtle (n=1).

- Ninety-two sharks were recorded during the survey, consisting of unidentified shark species (n=48), unidentified Carcharhinidae shark species (n=16), blue shark (n=7), sandbar shark (n=5), white shark (n=4), unidentified hammerhead species (n=4), dusky shark (n=3), common thresher shark (n=1), silky shark (n=1), tiger shark (n=1), shortfin mako (n=1), and scalloped hammerhead (n=1).

- Twelve large bony fish were recorded during the survey, consisting of unidentified tuna species (n=4), ocean sunfish (n=3), Atlantic bluefin tuna (n=3), mahi-mahi (n=1), and unidentified billfish species (n=1).

- No rays were recorded.

- The leatherback turtle and scalloped hammerhead are ESA-Listed species (Federally and Massachusetts State Listed as Endangered, and Federally Listed as Endangered respectively).

2. Introduction

APEM and Normandeau were contracted by Equinor Wind US to provide combined spring through fall digital aerial wildlife surveys of the Massachusetts Lease Area OCS-A 0520. This will comprise the second year of surveys following the initial Year 1 surveys undertaken from March 2020 to November 2021. Surveys will be carried out on a monthly basis from March 2021 through October 2021, except for April, May, August, and September, when two surveys per month shall be carried out in order to coincide with potential use of the area by roseate tern (*Sterna dougallii*).

The aims and objectives of the work are to assess the abundance and distribution of birds, marine mammals, sharks, rays, and turtles present in the Lease Area OCS-A 0520 over the course of the spring to fall period. The surveys will provide the baseline information required for conducting impact assessments and are consistent with the survey guidelines for providing avian, marine mammal, and sea turtle information for renewable energy development on the OCS (BOEM 2017 and 2019).

The Survey Area referred to herein is comprised of the Lease Area OCS-A 0520, plus a 2 km (*c*. 1 NM) buffer surrounding it with an approximately 4 km (*c.* 2 NM) buffer towards the northeast end.

Images were captured using a grid-based survey design with a 1.5 cm ground sampling distance (GSD). Images were analyzed by APEM and quality assurance was undertaken by Normandeau. This report describes the results of the second August 2021 survey.

3. Summary of Survey

The survey was undertaken on August 17th, 2021 from 17:42 to 19:40 (UTC). Data collected were 1.5 cm GSD digital still images using a GPS-linked bespoke flight management system to ensure the tracks were flown with a high degree of accuracy.

The digital aerial survey captured images along nine lines spaced approximately 1.9 km across-track and 0.5 km along-track between image nodes within the survey area (**Figure 1**). Coverage of images analyzed was calculated to be approximately 10% of the survey area.

On August 17th, 2021, the cloud cover was recorded as 10-40% (few – scattered), visibility was greater than 10 km (6.2 miles), and no precipitation was recorded. Wind speed was recorded as 10 knots from a southwesterly direction. The outside air temperature at the survey altitude was recorded as 70°F. The sea state was 1 (calm [rippled]), and the water turbidity was 0 (clear). The survey was conducted at an altitude of approximately 1,360 ft at a speed of approximately 150 knots.

No health and safety issues were reported during the survey.

APEM analyzed the images to enumerate birds to species level, and to enumerate any other non-avian marine fauna. Normandeau provided quality assurance (QA) of the data to check for missed animals in 10% of images recorded as empty, and quality assured 20% of the bird species identification undertaken by APEM (and 100% of Listed species). Normandeau also identified 100% of the species of non-avian marine fauna including marine mammals, turtles, sharks, and rays. Birds and marine fauna identified from the images were ‘snagged’ (i.e., located within the images) and categorized to species when possible, otherwise to the species grouping.

Data reported are raw counts of animals that have not yet been subject to extrapolation for population estimates.

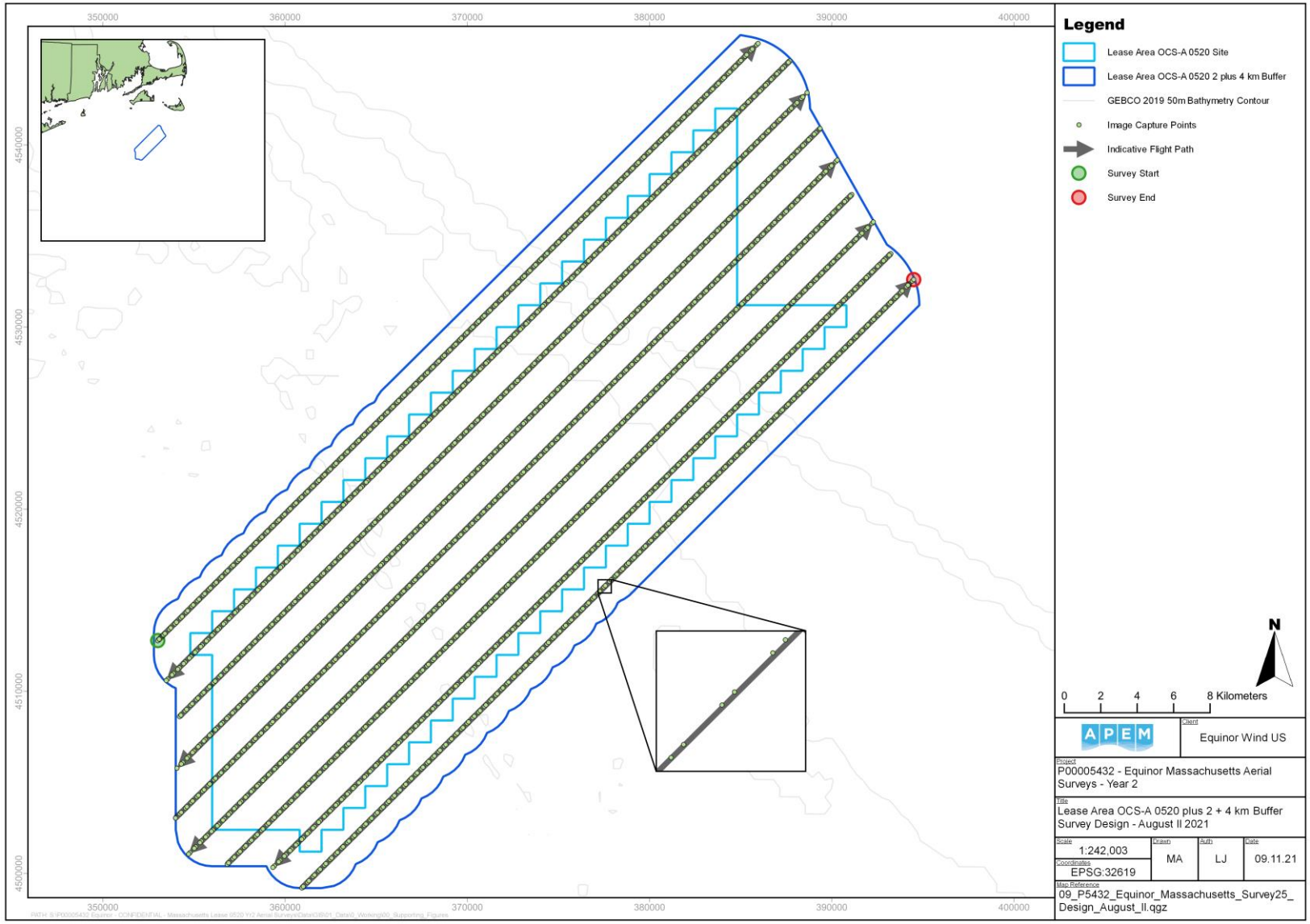


Figure 1 Survey design of Lease Area OCS-A 0520 plus 2 km / 4 km buffer

4. Abundance and Distribution

4.1 Species Abundance

The numbers of marine wildlife species recorded during the second August 2021 survey are presented in **Table 1** and †Note: 'Commic' refers to either common or Arctic tern (*Sterna hirundo* / *paradisaea*)

Table 2. Species scientific names are provided in Appendix I. Example individuals recorded during the surveys are provided in Appendix II.

Table 1 Total number of individuals of birds recorded during the second August 2021 survey of the Lease Area OCS-A 0520 WEA plus 2 km / 4 km irregular buffer

Group	Species	Flying	Sitting	Total
Shorebird	Red / Red-necked Phalarope	0	40	**40**
Gull	Laughing Gull	1	0	**1**
	Herring Gull	5	2	**7**
	Lesser Black-backed Gull	1	1	**2**
	Large Gull species	0	2	**2**
	Gull species	0	1	**1**
Tern	'Commic'† / Forster's Tern	3	0	**3**
Storm Petrel	Storm Petrel species	93	0	**93**
Shearwater	Cory's Shearwater	7	26	**33**
	Great Shearwater	19	20	**39**
	Large Shearwater species	0	8	**8**
Total Birds		***129***	***100***	***229***

†Note: 'Commic' refers to either common or Arctic tern (*Sterna hirundo* / *paradisaea*)

Table 2 Total number of individuals of marine megafauna recorded during the second August 2021 survey of the Lease Area OCS-A 0520 WEA plus 2 km / 4 km irregular buffer

Group	Species	Submerged	Surfacing	Total
Marine Mammal	Seal species	0	1	**1**
	Common Dolphin	2	0	**2**
	Common Bottlenose Dolphin	3	0	**3**
Turtle	Leatherback Turtle	0	1	**1**
Large Bony Fish	Mahi-mahi	1	0	**1**
	Ocean Sunfish	3	0	**3**
	Atlantic Bluefin Tuna	3	0	**3**
	Tuna species	4	0	**4**
	Billfish species	1	0	**1**
Shark	Common Thresher Shark	1	0	**1**
	Silky Shark	1	0	**1**

Group	Species	Submerged	Surfacing	Total
	Dusky Shark	3	0	**3**
	Sandbar Shark	5	0	**5**
	Tiger Shark	1	0	**1**
	Blue Shark	7	0	**7**
	Carcharhinidae Shark species	16	0	**16**
	White Shark	4	0	**4**
	Shortfin Mako	1	0	**1**
	Scalloped Hammerhead	1	0	**1**
	Hammerhead species	4	0	**4**
	Shark species	48	0	**48**
Total Marine Megafauna		***109***	***2***	***111***

4.2 Spatial Distribution

Figure 2 shows the location of all species recorded throughout the Survey Area.

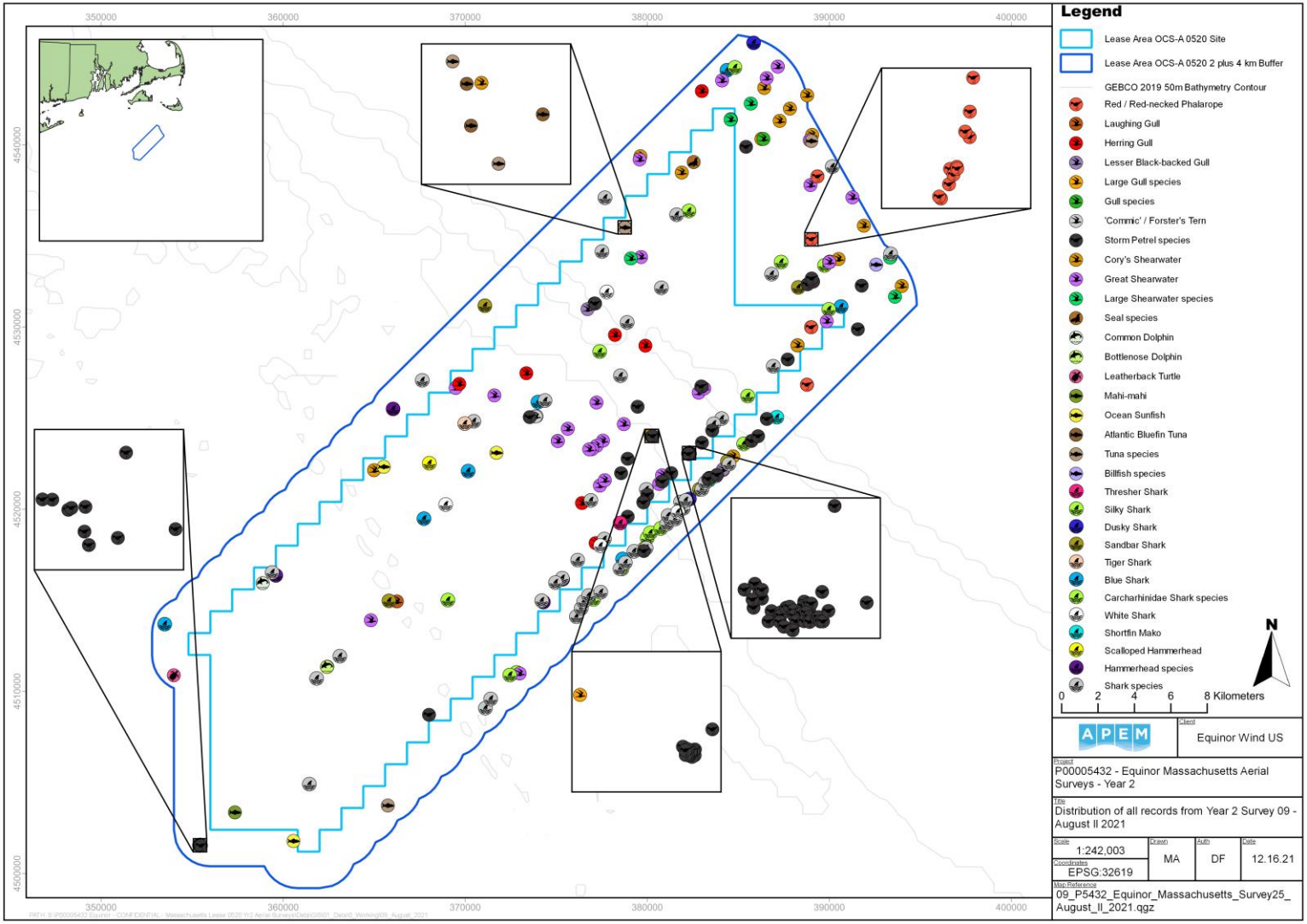


Figure 2 Distribution of all records from the second August 2021 survey of Lease Area OCS-A 0520 plus 2 km / 4 km irregular buffer

Note: Individuals may appear to overlap if they are in close proximity to each other.

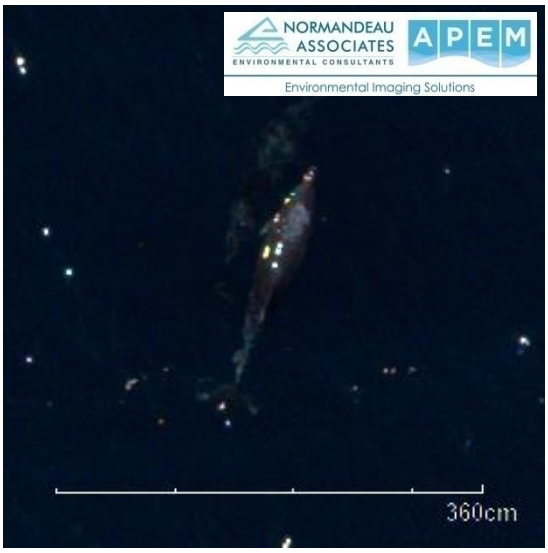
5. Shipping Observations

During the August 17th, 2021 survey, no vessels were recorded visually from the aircraft or in the imagery.

Appendix I Species List

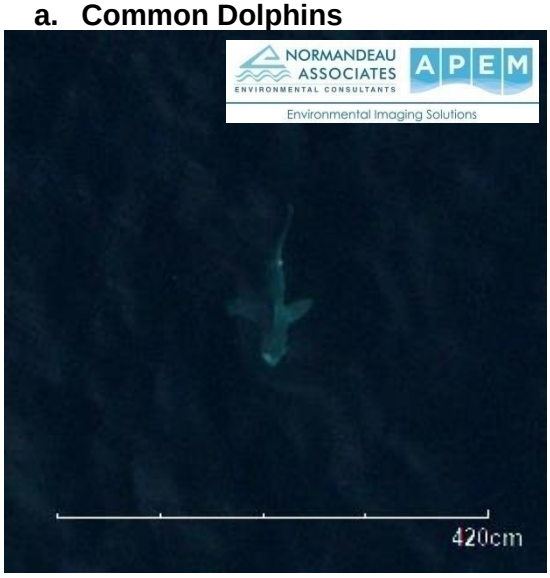
Common Name	Scientific Name	Family	Class
Red-necked Phalarope	*Phalaropus lobatus*	Scolopacidae	Aves
Red Phalarope	*Phalaropus fulicarius*	Scolopacidae	Aves
Laughing Gull	*Leucophaeus atricilla*	Laridae	Aves
Herring Gull	*Larus argentatus*	Laridae	Aves
Lesser Black-backed Gull	*Larus fuscus*	Laridae	Aves
Common Tern	*Sterna hirundo*	Laridae	Aves
Arctic Tern	*Sterna paradisaea*	Laridae	Aves
Forster's Tern	*Sterna forsteri*	Laridae	Aves
Cory's Shearwater	*Calonectris borealis*	Procellariidae	Aves
Great Shearwater	*Ardenna gravis*	Procellariidae	Aves
Common Dolphin	*Delphinus delphis*	Delphinidae	Mammalia
Common Bottlenose Dolphin	*Tursiops truncatus*	Delphinidae	Mammalia
Leatherback Turtle	*Dermochelys coriacea*	Dermochelyidae	Reptilia
Mahi-mahi	*Coryphaena hippurus*	Coryphaenidae	Actinopterygii
Ocean Sunfish	*Mola mola*	Molidae	Actinopterygii
Atlantic Bluefin Tuna	*Thunnus thynnus*	Scombridae	Actinopterygii
Common Thresher Shark	*Alopias vulpinus*	Alopiidae	Chondrichthyes
Silky Shark	*Carcharhinus falciformis*	Carcharhinidae	Chondrichthyes
Dusky Shark	*Carcharhinus obscurus*	Carcharhinidae	Chondrichthyes
Sandbar Shark	*Carcharhinus plumbeus*	Carcharhinidae	Chondrichthyes
Tiger Shark	*Galeocerdo cuvier*	Carcharhinidae	Chondrichthyes
Blue Shark	*Prionace glauca*	Carcharhinidae	Chondrichthyes
White Shark	*Carcharodon carcharias*	Lamnidae	Chondrichthyes
Shortfin Mako	*Isurus oxyrinchus*	Lamnidae	Chondrichthyes
Scalloped Hammerhead	*Sphyrna lewini*	Sphyrnidae	Chondrichthyes

Appendix II Example 'Snags' from the Survey

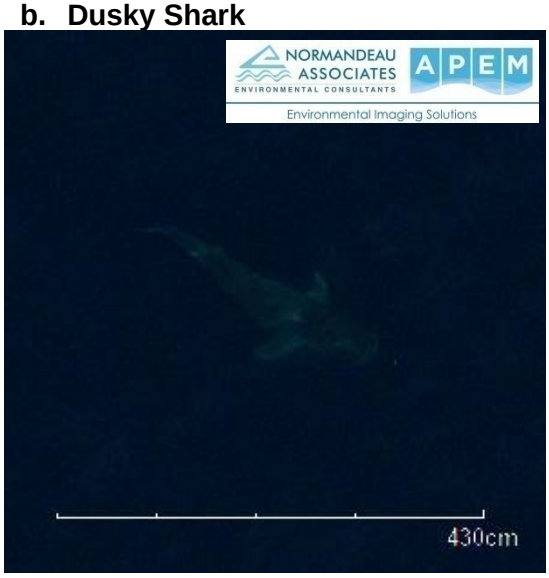


a. Common Dolphins

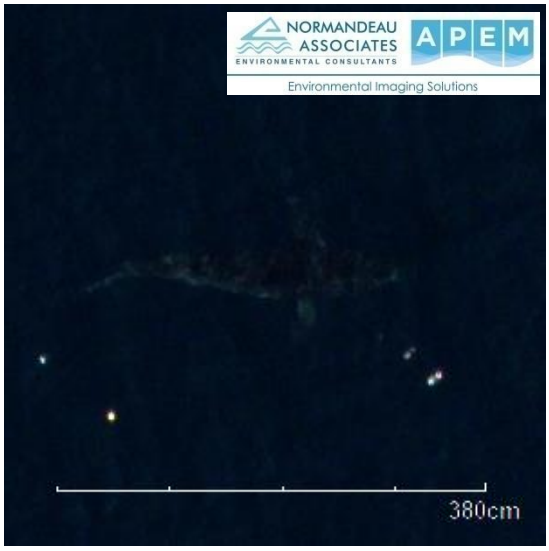
b. Dusky Shark



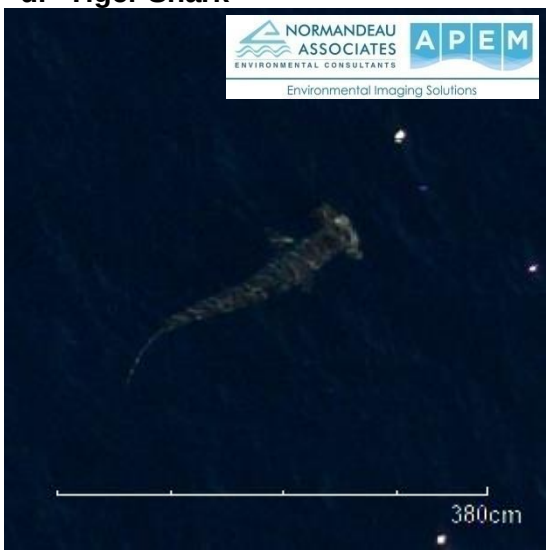
c. Sandbar Shark



d. Tiger Shark



e. White Shark



f. Scalloped Hammerhead